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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
JOLLEY, KIRSTEN	
ART UNIT	**PAPER NUMBER**
1762	

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/085,527	DOPPER, GEBHARD	
	Examiner	Art Unit	
	Kirsten C. Jolley	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,12,13 and 18-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12,13 and 18-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on June 30, 2006 has been entered.

2. The RCE filed June 30, 2006 stated that arguments filed in the Appeal Brief of Reply Brief of December 16, 2005 should be considered. The Examiner telephoned Applicant's attorney, John Musone, on September 13, 2006 to state that on December 16, 2005 only blank appendices for the Appeal Brief were submitted. The Examiner verified with Applicant's attorney that he intended that the after-final amendments of August 6, 2004 are entered. Accordingly, the after-final amendments and arguments to the specification and claims submitted August 6, 2004 have been entered and are considered herein.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Europe on August 17, 2000. It is noted, however, that applicant has not filed a certified copy of the European application as required by 35 U.S.C. 119(b).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-10, 12-13, and 18-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claims are directed to a method of measuring the actual contour line geometry of a curved surface, comparing the actual geometry data with a desired contour line geometry data, and controlling spray parameters based on the comparison of the actual geometry data and the desired contour line geometry data. While the specification discloses the limitation briefly on page 15, the specification as a whole is directed to achieving *homogeneous* surface roughness along a contour line of a component. Homogeneous surface roughness can only be achieved by constant roughening of the surface -- if any one region is roughened/abraded more than another, then the resulting surface is not homogeneously rough. Applicant's own specification at page 14, lines 24-27 states "To achieve a homogeneous surface roughness, the jet parameters are in the process deliberately matched to the contour line." The specification does not enable an engineer having ordinary skill in the art how to compare the actual geometry data with desired contour line data while also achieving a homogeneous surface roughness. It appears to the Examiner that such would not be possible. Controlling spray parameters to achieve a desired contour line geometry

implies that certain regions of the contour line will be abraded more than others, which would necessarily result in non-homogeneous surface roughness -- contradicting the overall teachings of the specification.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 18-20 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 18 requires both controlling a plurality of spray parameters "to match the desired data" and resulting "in the curved surface having a substantially uniform surface roughness." These two claim limitations appear contradictory. If a measured control line geometry is abraded to matched a desired geometry, then certain areas will be abraded more than others resulting in non-uniform surface roughness.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-10, 12-13, and 18-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor et al. (US 5,520,516) alone or in view of McComas et al. (US Re. 35,611), and further in view of Kaiba et al. (US 6,096,132).

With respect to claims 1-4, 12, 18-19, 21, and 25, Taylor et al. discloses a method of applying a zirconium-based oxide ceramic coating to a metallic bond coated superalloy turbine blade tip of a gas turbine engine. Taylor et al. teaches that prior to coating, the blade tip should be roughened just prior to coating for the best bond strength (col. 3, lines 60-67). Taylor et al. teaches that the method for roughening can be abrasive grit blasting. It is noted that the tip of a turbine blade has a curved surface. Taylor et al. lacks a teaching of measuring the contour line geometry of the turbine blade tip, inputting the measured geometry into a control system, comparing the actual geometry data with the desired contour line geometry data, and controlling a plurality of spray parameters of the blasting system via the control system based on the geometry such that at least one of the parameters remains constant during the blasting.

It is the Examiner's position that an engineer having ordinary skill in the art would have recognized that each of the blasting distance, intensity, angle, and time would directly affect the amount and degree of roughness produced on any given area on a substrate surface during an abrasive grit blasting process. Further, it is the Examiner's position that an engineer skilled in the art would have recognized that it is desirable to perform a constant amount of roughening over the entire substrate surface in order to produce a coated surface where the coating is evenly adhered to the entire substrate surface, thereby producing a uniform coating applied thereon. For example, if a first region of the substrate is blasted for a longer period of time or with higher intensity or at a closer distance between the blasting apparatus and surface than a second region,

then one skilled in the art would expect that the first region would result in a rougher surface than that blasted for a shorter period of time or with less intensity or from a farther distance. Surfaces with different roughness would have different levels of coating adherence. Further, since a turbine blade tip is a curved surface, constant roughening would require following the contour line geometry of the curved surface. Therefore, it would have been obvious to one skilled in the art to have maintained at least one of the blasting distance, intensity, angle, or time constant along the contour of the substrate surface in order to form an even and consistently roughened surface, thus ensuring that the coating is uniformly adhered to the entire substrate surface.

Alternatively, McComas et al. is cited as further evidence that consistent and uniform blasting is known and desirable when abrading turbine jet engine components such as turbine blades. McComas et al. teaches that critical parameters of its abrading process include nozzle distance from the surface and the liquid pressure (blasting intensity) (col. 3, lines 1-8). While McComas et al. discloses the use of blasting with water on a coated surface instead of abrasive grit blasting on an uncoated surface, both processes blast material at a surface using a jet for the purpose of abrading the surface beneath, and therefore similar principles regarding blasting distance and blasting intensity would apply to both grit blasting and water jet blasting. It would have been obvious for one having ordinary skill in the art to have maintained a constant nozzle distance and constant blasting intensity during abrasive grit blasting in the process of Taylor et al., upon seeing the reference of McComas et al., in order to uniformly roughen the surface.

It is also the Examiner's position that an engineer skilled in the art would have known of the use of automatic control systems, and that such control systems are advantageous in

performing processes more efficiently and cost effectively by automating activities instead of performing them manually. It is well settled that it is not inventive to broadly provide a mechanical or automotive means to replace manual activity which has accomplished the same results. *In re Venner et al.*, 120 USPQ 192. One having ordinary skill in the art having seen the reference of Taylor et al., alone or in combination with McComas et al., would have been motivated to look to the prior art for spray systems that are capable of maintaining a uniform spray along an entire surface of a curved substrate, so that the curved blade tip of Taylor et al. may be uniformly grit blasted and coated.

Kaiba et al. is cited for its teaching of an automatic painting device for use on a substrate surface having a curved shape, where the device is capable of keeping a constant interval between the spray gun heads and the surface to be painted. Kaiba et al. teaches measuring Z axis direction displacement distances at coordinate points along the surface, inputting the measured geometry into a control system, and controlling the spraying such that the distance from the spray head to the substrate surface remains constant when traversing over the entire curved surface (col. 4-5). It would have been obvious to one having ordinary skill in the art to have performed the abrasive grit blasting step of Taylor et al. using a spray control system as taught by Kaiba et al. in order to ensure that uniform blasting is performed along the entire three-dimensional curved blade tip surface, and also to provide an automatic blasting process thus improving efficiency. While Kaiba et al. is directed to a painting process instead of grit blasting, the control system used to control the sprayer would be similar.

With respect to the newly added claim limitations of comparing the actual geometry data with the desired contour line geometry data and controlling spray parameters based on the

comparison of the actual geometry data and the desired contour line geometry data, the Examiner notes that it is well known to a skilled engineer to compare a desired data set with an actual measured data set and determine differences therein. It is the Examiner's position that it would have been obvious to an engineer having ordinary skill in the abrading art to have abraded/blasted more or less in one region versus another as a means of achieving a particular desired contour line geometry.

As to new claims 26-28, the Examiner notes that spray jet capable of following a curved contour line along a surface of a component such as a turbine blade tip necessarily must move and rotate relative to the metal component, and must necessarily be movable in two Cartesian dictions and pivotable. Such a sprayer is illustrated in Kaiba et al. discussed above.

As to claims 6-10, Taylor et al. teaches that the first metallic bond coating may be NiCoCrAlY, and the ceramic coating applied thereon is yttria stabilized zirconia (col. 6, lines 63-64).

As to claim 13, the apparatus of Kaiba et al. illustrates using an angle in the range of 20-90 degrees with respect to a curved surface. Alternatively, it is noted that McComas et al. teaches that blasting angle is a matter of preference, but an angle between 20-90 degrees may be used and 45 degrees is most preferred (col. 3, lines 9-22).

As to claims 5 and 20, while it is noted that Kaiba et al. does not teach that the blasting angle is maintained constant. However, it is the Examiner's position that it one skilled in the art would have recognized that different blasting angles would produce different results, specifically different degrees and locations of blasting. It would have been obvious for one having ordinary skill in the art to have maintained a constant blasting angle in the process of Taylor et al., as

modified by Kaiba et al., in order to maintain a constant amount of roughening over the entire substrate surface and to produce a coated surface where the coating is evenly adhered to the entire substrate surface, thereby producing a uniform coating. Alternatively, it is noted that McComas et al. teaches that the blasting angle affects the fragment location post-blasting, and the direction helps to remove the fragments from the interaction zone thereby ensuring that they do not interfere with the blasting process (col. 3, lines 18-22). It would have been obvious to one having ordinary skill in the art to have maintained the blasting angle constant in order to consistently remove the blasted fragments from the interaction zone since changing the angle would cause the fragments to move in a different location and thus potentially interfere with the blasting/abrading process.

Response to Arguments

10. Applicant's arguments filed August 6, 2004 have been fully considered but they are not persuasive. It is noted that the following arguments have already been argued at the Board of Appeals and Interferences and the Examiner affirmed.

Applicant argues that Taylor does not teach and would not fairly direct one skilled in the art to prepare a surface by grit blasting such that a uniform roughness is produced. While not specifically suggested by Taylor et al., it remains the Examiner's position that an engineer skilled in the art would have recognized that it is desirable to perform a constant amount of roughening over the entire substrate surface in order to produce a coated surface where the coating is evenly adhered to the entire substrate surface, thereby producing a uniform coating. The concept of and

desire for uniform roughening, for reasons of forming uniform coating, would be well understood and well known to an engineer skilled in the art.

Applicant also argues that the requirements to remove ceramic material from a metallic surface using a water jet are very different than the requirements to uniformly roughen a metal surface by grit blasting. While the requirements for a water jet and grit blasting may be different, similar principles regarding blasting distance and blasting intensity would apply to both blasting procedures -- grit blasting and water jet blasting. For example, in both grit blasting and water jet blasting, if a first region of the substrate is blasted for a longer period of time or with higher intensity or at a closer distance between the blasting apparatus and surface than a second region, then one skilled in the art would expect that the first region would result in a rougher surface than that blasted for a shorter period of time or with less intensity or from a farther distance.

Applicant argues that one skilled in the art would not turn to the automotive painting industry in order to learn how to uniformly roughen a metal surface by grit blasting. The Examiner maintains the position that one having ordinary skill in the art having seen the reference of Taylor et al., alone or in combination with McComas et al., would have been motivated to look to the prior art for spray systems that are capable of maintaining a uniform spray along an entire surface of a curved substrate, so that the curved blade tip of Taylor et al. may be uniformly grit blasted and coated. Whether spraying coating material or grit, the automatic robot of Kaiba et al. would evenly spray material along a curved contour substrate surface.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hockett (US 4,545,156), Baughman (US 4,694,672), and Appel et al. (US 6,189,473) are cited as references directed to apparatus capable of abrasive blasting contoured surfaces.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kirsten C. Jolley whose telephone number is 571-272-1421. The examiner can normally be reached on Monday to Wednesday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kirsten C Jolley
Primary Examiner
Art Unit 1762

kcj